Homeowner implementation of fuel treatments: A longitudinal analysis of adoption, maintenance, and support for agency action on public lands

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ABSTRACT

It is well documented that uncharacteristically large and intense wildland fire events are increasing in the western U.S. At the same time, there are increasing community developments in the Wildland-Urban Interface (WUI), putting more people at risk of damaging effects from wildfire than in the past. As this risk has increased, substantial efforts have been made to increase home protection activities among residents in at-risk communities. To date a limited number of studies have examined what actions homeowners are taking and why. Each of these studies has included data collection at a single point in time providing a snapshot of the factors that influence initial adoption of home protection activities. For such activities to be successful, however, they require adoption as well as maintenance over time. The project reported here seeks to expand on these previous studies by examining fire prevention efforts in six WUI communities in the western U.S. with data collected at two points in time, spaced three years apart. Research objectives include: 1) Employ longitudinal measures to compare responses throughout the study period to evaluate changes in citizen opinions and behavior regarding fuel reduction activities on public and private property; 2) Assess the influence of contributing factors on citizens' decisions to initiate and maintain treatments on private property and support agency fuel reduction activities; and 3) Develop strategies that promote citizen responsibility for initiating/maintaining treatments and lead to public acceptance of agency programs. Findings indicate participants are very knowledgeable about fire risk and are making efforts to mitigate their risk. The most common activities reported by homeowners in the first round of the study were vegetation related: thinning and pruning trees, and reducing the size and scope of the understory. These activities were still common three years later, although more emphasis was placed on maintaining work that had already been done. While some communities were participating in a formal defensible space program (i.e., FireSmart), others were taking a less formal approach. All were successful, and all were aided by agency involvement and support. Participants were largely supportive of agency efforts to mitigate fire risk on public lands, and were especially supportive of mechanical thinning and brush removal. Support was also generally high for use of prescribed fire, particularly in areas away from neighborhoods.

BACKGROUND AND PURPOSE

Research on the social aspects of fire management has been steadily increasing in recent years. Most of these studies have primarily focused on the relationship between knowledge, attitudes, and treatment support among the general public. General conclusions that can be drawn from this research include: knowledge is positively associated with treatment support (Carpenter et al. 1986), citizens have become more supportive of treatments over time (Brunson and Shindler 2004), outreach programs can positively influence attitudes (Loomis et al. 2001, Toman et al. 2006), and support for treatment use depends upon the citizen-agency relationship and history of prior activities including fire management activities (Winter and Fried 2000, Shindler and Toman 2003). While most of these studies have principally assessed prescribed fire, research suggests similar results regarding thinning activities (Loomis et al. 2001, Shindler and Toman 2003).

There is less research available on homeowner implementation of treatment activities. Findings from a qualitative study suggest that homeowners balance home protection activities with other values they hold for their property (Nelson et al. 2005). In some cases, homeowners may not implement defensible space activities because they perceive them to be incompatible with other values such as their landscape preferences. Additional research has identified that treatment decisions are also influenced by homeowner beliefs about the effectiveness of defensible space treatments, fire behavior, and condition of nearby landscapes (Winter and Fried 2000, Nelson et al. 2005). Similarly, Daniel et al. (2003) write that homeowners make their decisions to initiate or maintain treatments based on a complex set of tradeoffs including perceptions of risk and aesthetic impacts. Finally, neighboring landowners are also likely to influence treatment decisions (Nelson et al. 2003). Supportive neighbors can be effective at encouraging (or discouraging) fuel reduction activities on both public and private lands.

This overview suggests key explanatory variables for the support of agency treatments and behavior of property owners include: knowledge, attitudes, citizen-agency relationship, history of past actions, landscape preferences for property, risk perceptions, time, cost, and influence of neighbor participation.

Over the last several years, large scale education and financial assistance programs—much of it through the National Fire Plan—have been employed nationwide to increase home protection activities. The overall effects of these efforts have not been well articulated. While it is easy to track the numbers of acres treated, long-term success depends on managers' ability to encourage enduring behavior for property protection and develop support for broader treatments across landscapes. Specifically, additional research is necessary to evaluate the decisions made by individual homeowners about initial adoption of fuel treatments as well as their maintenance over time.

Currently a research gap exists: Fire management professionals need a better understanding of the factors that influence a long-term commitment among citizens. The majority of the research cited above is cross-sectional, consisting of data collected at a single point in time (an exception is Shindler and Toman (2003) who measured citizen attitudes and understanding over a four-year study period). While ecological research has a long history of tracking forest conditions over time and evaluating how ecosystems respond to both natural and human influences, the social science complement has been slower to evolve (Beckley and Korber 1995). There is a lack of longitudinal data from which to track how people and communities react to changing conditions. Babbie (1995, p.95) described one-time, cross sectional studies as attempting to "determine the speed of a moving object on the basis of a high-speed, still photograph that freezes the movement of the object." Consequently, we have limited ability to measure change in citizen attitudes and behavior including maintenance of defensible space and support for agency fuel treatment programs. The purpose of this project is to begin to fill this gap by establishing a long-term evaluation of citizen attitudes and behavior regarding treatment activities in forest communities.

This project expands upon prior research regarding beliefs, attitudes, and behaviors regarding fire and fuel management to assess the influence of different approaches on citizen behavior (e.g., to undertake and maintain defensible space as well as support WUI fuel treatments) and to

monitor these conditions over time. The study includes citizens in at-risk communities, particularly those who have implemented fuel mitigation activities on their property. Research objectives include:

1. Employ longitudinal measures to compare responses throughout the study period to evaluate changes in citizen opinions and behavior regarding fuel reduction activities on public and private property.
2. Assess the influence of contributing factors on citizens' decisions to initiate and maintain treatments on private property and support agency fuel reduction activities.
3. Develop strategies that promote citizen responsibility for initiating/maintaining treatments and lead to public acceptance of agency programs. Conduct one or more workshops to discuss findings and implications with project cooperators and partner groups.

STUDY DESCRIPTION AND LOCATIONS

Research design

This research used a multiple case study design and employed both qualitative and quantitative methods to gain an in-depth understanding of each study site. The strength of this research approach is that data collection and analysis are connected to appropriate contextual factors at each location while allowing for the exploration of findings in multiple settings. Data collection took place in six WUI communities in the western US. Data were collected in two phases. Data from phase I (2006-2007) were used to establish baseline data while data from phase II (2009-2010) were used to examine consistency and changes in responses over time.

WUI communities in Oregon, Utah and Idaho were purposively selected (Babbie, 2001; Rubin & Rubin, 2005) using information provided by contacts within state agencies and defensible space programs. Criteria for site selection included collective action within a community to create defensible space, either through participation in a formal defensible space program (i.e., FireSmart, Fire Wise) or through individual neighborhood actions, often in cooperation with government agencies. Participants were identified through lists provided by primary local contacts. In all cases but Idaho this contact was a member of the HOA or a community leader. As a focus of the project is the long-term maintenance of defensible space, we asked that the list provide a range of community members with different levels of interest and participation in fire mitigation activities. In Idaho, where there were no distinct neighborhoods, the FireSmart program helped identify a specific area in the county that met our criteria and provided a list of homeowners in that area who had participated in their program.

Data were collected using a structured interview format with a mix of open-ended and closed choice questions, followed by a 2 page survey comprised of mostly closed ended questions. The majority of interviews took place on the participant's property, and lasted for an average of 45 minutes. Interviews were recorded both digitally and through detailed notes (Kvale, 1996). Open ended questions and ancillary information offered during the interview were coded for themes (Miles & Huberman, 1994; Rubin & Rubin, 2005). After each interview, researchers completed

an assessment of the property's defensible space using a checklist adapted from those used by the state forest agencies.

Phase I interviews were conducted in each neighborhood until data saturation was reached (Rubin & Rubin, 2005); indeed, in each case we sampled well beyond saturation to ensure an adequate sample size would still be available for the second phase of this longitudinal study. This type of purposive sampling is not meant to be representative of a larger population, but rather to provide a rich and deep understanding of the issue at hand by learning from individuals who are intimately involved (Babbie, 2001; Rubin & Rubin, 2005).

Initially the research team planned to conduct Phase I data collection at all locations during summer 2006, but due to fire evacuations and difficulties arranging local contacts site visits were delayed in OR A, UT A and UT B until 2007. In order to maintain consistency of three years between site visits, the decision was made in consultation with the Forest Service technical representation to delay Phase II in these locations until summer 2010. Such challenges are not uncommon in longitudinal data collection and increase the already difficult situation involved in completing a longitudinal project in a limited five-year timeframe. Most of the findings in this report come from Phase I of data collection. In the "defensible space" section of this report's Key Findings, Phase II data are presented from three sites (ID, OR B, and OR C) where the second round of data was collected in 2009. Phase II data collection in the remaining communities is currently underway and is supported by other resources (summer 2010).

Site Characteristics

Central Oregon:
Oregon A and Oregon B are located close to Sisters, Oregon (population of 1,745, elevation 3,200 feet, average annual precipitation 13.62"). Oregon A has 200 ~1 acre lots; Oregon B is composed of 440 ~0.5 acre forested lots. The majority of lots in both neighborhoods have homes or other structures on them. Forests in the area are characterized as classic ponderosa pine that historically experienced frequent, low intensity fires. The forests surrounding Oregon A and B are managed by the Deschutes National Forest. In the past 5 years Oregon A and B have had multiple large fires nearby; in 2006 one of these fires came close enough to warrant evacuation, but did not cause any direct damage within the neighborhoods (Table 1).

Oregon C is located outside of La Pine, Oregon (population of 1,585, elevation 4,235 feet, average annual precipitation of 11.73"). The neighborhood is comprised of 102 forested lots ranging from 0.5 to 1 acre in size. Most lots have homes or other structures on them. The forest surrounding the neighborhood is a mixture of lodgepole and ponderosa pines. Lodgepole pine forests are historically characterized by high intensity fires that tend to occur less frequently than the classic ponderosa pine fire regime. Public forests around the neighborhood are managed by the BLM, Forest Service, and Oregon Department of Fish and Wildlife. There have been several recent fires, but none have directly impacted the neighborhood.

All three neighborhoods have homeowner association groups, although they vary in their formality. Oregon A's homeowner board is run by elected officers, with at least one officer

primarily responsible for fire related activities. While Oregon C has a homeowner group, most residents attribute the neighborhood's fire preparedness activities to an individual who took on fire risk mitigation as a personal mission, but is not associated with the HOA. In addition to a board, Oregon B has a paid onsite property manager who is very proactive in fire protection.

Deschutes County is one of 11 counties in Oregon that is covered by the Oregon Forestland-Urban Interface Protection Act of (1997), a unique law that requires landowners in communities assessed to be at high risk from wildfire to reduce vegetation from around structures, along driveways and around property lines. Once work has been completed the property becomes certified. If a landowner fails to comply with the law and does not become certified, they are potentially liable for up to $100,000 of fire suppression costs if a fire starts on their land.

Kootenai County, Idaho:
Kootenai County is located in the northern Idaho panhandle. Our study area was north of Coeur d'Alene, Idaho around the community of Athol (population 676, elevation 2,392 feet, annual precipitation 25"). Participants' property ranged from 1-20 acres with an average size of 9 acres. The area is heavily forested with a mixture of public and private ownerships, however forests immediately surrounding the majority of study participants were privately owned. Forests in this area are best categorized as northern Rockies dry mixed conifer, with predominant conifer species being ponderosa pine, western larch, Douglas-fir, and lodgepole pine, in varying combinations and co-dominance. Historically these forests have experienced a mixed severity fire regime with fire events occurring every 25-40 years in a mosaic pattern of high severity and low severity patches (Barrett, 2004). Forests immediately surrounding most sample properties were predominately composed of lodgepole pine, with some western red cedar on higher elevation properties.

Kootenai County has a proactive fire prevention program called FireSmart Kootenai County. The FireSmart program uses its National Fire Plan dollars to pay local contractors to create defensible space for 100 feet around homes in high fire risk areas. Work was done for free by the contractors with homeowners being responsible for disposal of the vegetation debris produced by the treatments. Homeowners participated in the program by either contacting the FireSmart office or being recruited by contractors that went door-to-door to seek out participants. Once work was completed, homeowners were supplied with information on maintaining their defensible space and fire safety. None of the properties were part of an organized neighborhood group. No recent wildfires have threatened the area.

Cedar City Area, Utah:
Cedar City (population 25,665, elevation 5,834, average annual precipitation is 10.64") is located in SW Utah. We sampled two neighborhoods in this area; Utah A is located just outside city limits, and Utah B is approximately 20 miles to the south. The forests within and surrounding the neighborhoods are characterized as pinyon-juniper/hardwood. The historic fire regime is complex, with some areas experiencing frequent, low intensity fire and others characterized by high intensity, infrequent fire (Paysen *et al.*, 2000).

Utah A is located on a steep slope with 165 forested lots, ranging from 1-2 acres in size; less than half of the lots have homes or structures on them. The neighborhood has a formal homeowner

group, ran by elected property owners. The responsibilities of one board member are wholly dedicated to fire prevention, while other officers are also involved in fire safety efforts. The neighborhood works closely with the Utah Division of Forestry, Fire and State Lands in a program that compensates the neighborhood for homeowner hours worked on creating defensible space, through matching funds or assistance with removing and chipping vegetation. The neighborhood has never been evacuated or threatened by fire.

Utah B is composed of 33 forested lots, 2-3 acres in size; just over half of the lots have homes on them. The neighborhood was evacuated due to a fast moving, large wildfire in 2005. While no homes burned down, at least one had damage from radiant heat, and several experienced smoke damage. Several vacant lots were burned. The neighborhood does not have a formal homeowner's group, but after the fire neighbors began to work together, galvanized by one individual, to become more fire safe. Utah B has received some state assistance, particularly with chipping of removed material.

Table 1. General site characteristics and sample sizes

Site Name	Forest Type	Parcel Size (acres)	Area recently evacuated due to wildfire	HOA	# of study participants Phase I	# of study participants Phase II	# of returned surveys Phase I	# of returned surveys Phase II
Idaho	northern Rockies dry mixed conifer	1 – 20	No	No	40	26	36	24
Oregon A	ponderosa pine	1	Yes	Yes	40	TBD	40	TBD
Oregon B	ponderosa pine	0.5	Yes	Yes	46	27	42	26
Oregon C	lodgepole and ponderosa pine	0.5 – 1	No	Yes	40	21	36	18
Utah A	pinyon-juniper/ hardwood	1-2	No	Yes	23	TBD	21	TBD
Utah B	pinyon-juniper/ hardwood	2-3	Yes	No	9	TBD	9	TBD

KEY FINDINGS

Defensible space

Amenity values:
Amenity values are important to consider because defensible space actions that negatively impact the amenities people most value about their properties are likely to be met by resistance, while actions that enhance the values, or at least do not conflict are more likely to be supported.

Participants value their properties for a variety of reasons, but by far the most important amenity value in both study years are the natural features of their properties and the surrounding landscape (i.e., trees, natural setting, wildlife, etc.) (Phase I = 84%, Phase II = 75%). This indicates that defensible space actions perceived to be compatible with natural features are more likely to be acceptable than those perceived as incompatible. However, this does not mean that people are unwilling to cut trees when density is high; many people reported thinning trees and removing brush to improve the aesthetics of their properties, actions that are compatible with defensible space goals. The second most frequent amenity value was "rural setting" (Phase I = 68%, Phase II = 53%), of which privacy was an important component. In some areas where the degree of thinning dramatically increased visibility between neighbors, residents complained that too many trees had been cut.

Perceptions of wildfire risk:
The majority of participants felt their home was at risk from fire, however, few participants thought they were at *high* risk from fire—most placed themselves at a moderate or even low risk level (Phase I = 93%, Phase II = 86%). Participant risk assessment appears to be in part a reflection of the mitigation work that had been done on their properties, with many participants reporting they had been at high risk prior to undertaking defensible space activities (63%).

Participants reported learning about fire risk from a number of sources, including common sense and personal experience. In sites with a Homeowners Association (HOA), the HOA or neighbors were mentioned as an information source by just under half of participants. Agency personnel were also listed as an important information source in Utah and Oregon sites.

Risk awareness served as the most common motivating factor for participants to take defensible space actions on their properties. Other frequently mentioned motivations included: government agency outreach, aesthetics, influence of a community leader or HOA, or participation in an outside program (i.e., FireSmart).

Actions taken:
The vast majority of participants had taken some action on their properties to lower their risk from wildfire. Thinning and pruning were the most common actions (Phase I = 96%, Phase II = 68%), followed by understory management (i.e., mowing, or brush removal) (Phase I = 85%, Phase II = 45%). In addition, many participants in Oregon A, Oregon B, Oregon C and Idaho talked about adding or maintaining a lawn, often both for aesthetics and fire protection. Roughly a third of participants reported using fire resistant building materials to reduce their home's fire risk (roofs and/or siding). In both Utah sites rock buffers are maintained for both fire protection and to keep mud out of the home during the winter. All of the Oregon sites are located in pine forests, and there is an emphasis on disposing of needles each season, particularly in Oregon A. Most people maintained treatments between surveys (66%).

Most homeowners did the work themselves (Phase I = 88%, Phase II = 92%), with roughly a quarter using private contractors, generally in tandem with their own work. Not surprisingly, given the nature of the FireSmart program in Idaho, 92% of participants there indicated they had used a private contractor – but clearly they were not dependant on the private contractor for doing all the work as 72% indicated they had also done some of the work themselves. Utah A is

involved in two government programs that offer direct assistance for vegetation management on individual properties, thus 42% of participants in Utah A indicated that a government agency had done the work. As the community had the most difficult terrain of our sites, many respondents indicated that this assistance was crucial in their ability to effectively and safely mitigate hazard on their parcels.

There is evidence that homeowners recognize that vegetation management is not a onetime event; most indicated plans to continue doing work in the future (Phase I = 93%, Phase II = 86%). Additional thinning, pruning, and brush removal were the most common planned actions (Phase I = 74%, Phase II = 38%) outside of maintaining work that had already been done (Phase I = 27%, Phase II = 74%).

Role of community groups/government agencies:
Participants in 5 of the communities (all except Idaho) reported having an active neighborhood group, either formal or informal, that helped influence actions on their properties. Meetings and newsletters were the most commonly named mechanism that formal HOAs used to promote defensible space. Direct communication through phone calls, letters, and/or email was also frequently cited.

Views on community-wide mitigation measures were on the whole quite positive with the majority of participants in most sites thinking their communities were doing "Excellent" or "Good" in taking action to protect themselves from fire (with the exception of Idaho, where perceptions were decidedly less positive). Reasons offered for why communities were doing well included common sense, cooperative neighbors, effective leadership, and experience with recent wildfires (particularly important in Utah B).

As for government agencies, participants felt that the agency had two primary roles: 1) to raise awareness of the risk and provide educational materials on mitigation actions (Phase I = 75%, Phase II = 45%); and 2) manage public land to reduce wildfire risk (Phase I = 15%, Phase II = 38%). Few participants indicated the government should be directly engaged in vegetation activities on private property. The number who indicated that the agencies were already doing a lot to mitigate risk increased between survey years (Phase I = 3%, Phase II = 29%).

Community perceptions of agency fuels treatments

Several noteworthy findings emerge from the data regarding acceptance of fuels management practices. First, there is substantial evidence that participants in each of the study locations think highly of the federal and state managers working in their area. While there was some variation in specific response levels, strong majorities gave agency managers high ratings both for their general management efforts as well as their actions to reduce the threat of fire. Even more striking, nearly all participants indicated a good relationship existed between local managers and community members. Such results may be surprising given the often contentious debate surrounding many forest management decisions in recent years. Other research has provided mixed results; while some studies found strong relationships between citizen and fire managers in some locations (e.g., Fleeger 2008), but other studies suggest such findings are not necessarily

universal (e.g., Shindler and Toman 2003). What is consistent across multiple studies, however, is the importance of these relationships to citizen support (e.g., Winter et al. 2002, Shindler and Toman 2003, Fleeger 2008).

Second, findings demonstrated relatively strong support for agency actions to actively reduce fuel loads on federal lands adjacent to participant communities. Mechanical thinning treatments received the highest support across the six study sites. A majority in each location also indicated acceptance of mowing understory vegetation. Except in Utah A and ID, similar numbers also indicated acceptance of the use of prescribed fire near neighborhoods. All sites showed greater acceptance of use of prescribed fire in remote forest areas than near neighborhoods. Interestingly, acceptance of the use of prescribed fire near neighborhoods was highest in those locations that had been most directly impacted by wildfire—UT B, OR A, and OR B. Only herbicides failed to receive much support; responses reflect both a lack of acceptance and a great deal of uncertainty with this potential method.

Lastly, acceptance levels were strongly associated with participant trust in agency managers to safely and effectively implement fuel treatments. In this study trust was operationalized in both a general variable (trust to make good decisions about wildfires and fire prevention) and specific measures of citizen trust in agency managers to responsibly use prescribed fire or thinning. Several previous studies have highlighted the significance of trust to support for agency fuel reduction actions (e.g., Winter and Cvetkovich 2008, Vaske et al. 2007, Winter et al. 2004). Findings here confirm the importance of citizen trust in managers to implement treatments to their support for those treatments.

Evacuation

Evacuations are inherently stressful events, and homeowners have reported in previous studies that uncertainty over what is happening is perhaps one of the most stressful aspects. While many difficult elements of evacuation cannot be mitigated—lives will most certainly be disrupted—uncertainty can be significantly reduced through frequent, open and detailed agency communication. Experiences relayed in two of our study communities illustrate this point, one in which there was very little agency communication and another that included regular, frequent, open communication for the entire duration of the fire. Where agency communication was lacking, the media filled the information gap with conflicting and often inaccurate reports. Two years following the fire, the community that received no official communication recalls the event in vivid detail and many still express fear of fire and lack of trust in fire management agencies. Conversely, the community that received abundant, timely information retains largely positive reflections of how the fire was managed and maintains trust and confidence in the managing agency. These experiences suggest the value of agency communication during a fire in reducing the stress of evacuation and maintaining positive long-term relationships.

MANAGEMENT IMPLICATIONS

Defensible space:
Each of the study communities are engaged in defensible space activities, some through a formal program (i.e., FireSmart), and others through informal neighborhood initiatives. While all different, each has been successful in educating residents and assisting them in mitigating wildfire risk, taking into consideration local preferences and needs. Agency support has been essential to each program, although the specific role of agency managers differed across communities (i.e., in Oregon participation was mainly education and offering grants, while in Idaho there was direct financial involvement in vegetation reduction activities through a government-sponsored program). A commonly held opinion among study participants was that the most important role for the agencies was educating residents on risk and mitigation. Several participants also noted a key agency role was to manage public land to reduce wildfire risk. Participants also recognize that agencies are already doing a lot, and are generally appreciative of these efforts.

Community perceptions of agency fuels treatments:
Participants were generally positive of agency fuel reduction efforts in the area of these WUI communities and provide additional evidence of strong support for such programs, even of the use of prescribed fire near neighborhoods. Ultimately, findings provide additional evidence of the importance of citizen confidence in agency managers to effectively implement treatment activities. While fostering citizen-agency interactions to build and maintain citizen confidence may seem peripheral to agency objectives, doing so is critical to long-term management success.

Evacuation:
Positive citizen-agency interactions can also contribute to the reduction of long-term negative impacts of wildfire. Two of the study communities had been evacuated by a fast-moving wildfire prior to data collection. There were substantial differences between these communities in levels of pre-fire preparation and citizen-agency relationships that appeared to contribute to the quality of communication during the fire event. In turn, higher quality of communication during the fire appeared to contribute to reduced stress during the evacuation, and based on the responses and imagery used during the interviews, a more complete recovery afterwards.

More research is warranted; this study did not set out to study long-term effects of evacuation and thus inference is limited to just these two circumstances. However, these experiences support previous research that has found high value in both the short- and long-term in providing evacuated residents with up-to-date, detailed information for the entire duration of a wildfire event (McCool et al., 2006; Taylor et al., 2007). When information is not available, this should be openly and honestly communicated to residents to prevent conspiracy-type theories from developing. Additionally, it appears to be vitally important for agencies to build relationships with local communities long before a wildfire starts. In central Oregon the local Forest Service has made it a priority over the years to build and maintain relationships with neighboring communities; their communication strategy during the fire can be seen as an extension of that relationship. The time and effort spent on that relationship can be seen as having "paid off" not only in relatively positive perceptions in fire management, but also in community preparedness for fire. Both of these aspects played an important role in decreasing residents' anxiety during

and after the fire. Given the increasing trends in fire prevalence and intensity, the number of communities directly impacted by wildfire is likely to increase in the future; positive citizen-agency relationships developed prior to and during a fire event will be vital in helping communities prepare for and cope with future wildfire events.

DELIVERABLES

Presentations

Toman, E., M. Stidham, S. McCaffrey, B. Shindler. 2010. Improving an inherently stressful situation: The role of communication during wildfire evacuations. Second Human Dimensions of Wildland Fire. International Association of Wildland Fire. San Antonio, TX: April, 2010.

McCaffrey, S., M. Stidham, E. Toman, B. Shindler. 2010. Homeowners and defensible space: Motivation to maintain and the role of local programs. Second Human Dimensions of Wildland Fire. International Association of Wildland Fire. San Antonio, TX: April, 2010.

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Stidham, M., Toman, E., S. McCaffrey, B. Shindler. In Review. Improving an inherently stressful situation: The role of communication during wildfire evacuations. Proceedings, IAWF Second Human Dimensions of Wildland Fire. Submitted July, 2010.

Reports

Frequency Report		Site						
		ID	OR A	OR B	OR C	UT A	UT B	All Sites
On-site interview	Phase I	√	√	√	√	√	√	√
	Phase II	√	12/2010	√	√	12/2010	12/2010	12/2010
Mail-back survey	Phase I	√	√	√	√	√	√	√
	Phase II	√	12/2010	√	√	12/2010	12/2010	12/2010

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